

## REMARKS

After entry of the instant Amendment, claims 1-10 and 25-29 remain in the application with claim 1 in independent form. Independent claim 1 is currently amended. Claims 26-29 are new. No claims are presently cancelled. Claims 11-18 were previously cancelled as non-elected claims that were subject to a Restriction Requirement. Claims 19-24 were also previously cancelled.

Independent claim 1 has been amended to specify that the atmospheric pressure plasma assembly is adapted to operate at a temperature between room temperature of 20°C and 70°C, support for which can at least be found in paragraph [0046] on page 15 of the original application as filed. New dependent claims 26-29 have been added to further specify positioning of the claimed atomizer and arrangement of the electrodes within the claimed assembly. Support for new claim 26 can at least be found in paragraph [0037] on page 11 of the original application as filed. Support for new claims 27 and 28 can at least be found in paragraph [0045] on page 14 of the original application as file. Support for new claim 29 can at least be found in paragraph [0024] on page 7 of the original application as filed. No new matter is added through the instant Amendment.

Claims 1, 2, 6-10, and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kolluri (PCT Publication No. WO98/10116) in view of Roth et al. (USPN 5414324). Claims 3-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kolluri in view of Roth et al. as applied to claim 1, and further in view of either Rickerby et al. (USPN 6,176,982) or O'Reilly et al. (PCT Publication No. WO02/35576). Claims 1-10 and 25 stand provisionally rejected under the judicially-created doctrine of obviousness-type

double patenting over copending U.S. App. No. 10/510555. The Applicants respectfully maintain the position that the rejections based upon the combined teachings of Kolluri and Roth et al. are improper on the basis that one of skill in the art would **not** have arrived at the instant invention based on the knowledge obtained as a result of the combined teachings thereof, especially in view of the instant amendments to independent claim 1 that specify that the claimed apparatus is adapted to operate at a temperature between room temperature of 20°C and 70°C. The Applicants respectfully request the Examiner to reconsider these rejections in view of the additional comments below that are intended to supplement all prior arguments. The Applicants further submit that none of the prior art relied upon by the Examiner to establish the current rejections discloses, teaches, or suggests the subject matter claimed in new claims 26-29.

In the Response After Final submitted on December 15, 2008, the Applicants set forth additional arguments to prove that a person of ordinary skill in the art would not have arrived at the instant invention based on the combined teachings of Kolluri and Roth et al. The Applicants also submitted another Declaration that was executed by Dr. Liam O'Neill, an expert in plasma technologies, which was originally submitted for a related application. The Declaration executed by Dr. O'Neill is again submitted (due to the fact that the Declaration was not entered because it was previously submitted after final rejection). The Declaration executed by Dr. O'Neill is particularly relevant to the instant circumstances because the Examiner has relied heavily upon Wang et al. (USPN 5366770) to refute the Applicants arguments against the Examiner's combination of the teachings of Kolluri and Roth et al., and

the Declaration executed by Dr. O'Neill clearly refutes the Examiner's position that Wang et al. teaches aerosol delivery in an atmospheric pressure glow discharge (APGD) plasma.

The Applicants still contend that the Examiner has failed to prove that a person of ordinary skill in the art would reasonably have been expected to modify the apparatus taught by Kolluri et al. to include the dielectric plate between the electrodes, as taught by Roth et al., under any circumstances regardless of the scope of the instant claims. The Applicants respectfully maintain that the intended use of the apparatuses taught by Kolluri and Roth et al. are so drastically different that one of skill in the art would not reasonably have been expected to combine the teachings of Kolluri and Roth et al. in the manner proposed by the Examiner under any circumstances, including for purposes of arriving at the instantly claimed invention. In particular, the apparatus of Kolluri is designed to operate at vacuum pressures, while the apparatus of Roth et al. is designed to operate at atmospheric pressures. Further, as the Applicants have repeatedly argued, general knowledge by those of skill in the art at the time of the instant invention suggested against use of atomized liquid in certain types of plasmas, like those taught by Roth et al., such that those of skill in the art would **not** have been expected to modify the apparatus of Kolluri to operate in the manner of the apparatus of Roth et al.

The Applicants believe that further explanation is necessary to explain and summarize some of the Applicants arguments for why it would not have been obvious to one of skill in the art to modify the disclosure of Kolluri based upon the teachings of Roth et al. This is the case because it appears that the Examiner has misunderstood the scope and purpose of the Applicants arguments relying upon the content of U.S. Patent No. 7,455,892 by indicating that "the claims of the instant application are not commensurate in scope with the claims now

issued in U.S. Patent No. 7,455,892” and that “[t]he Examiner has shown in the instant application why it would have been obvious to one of ordinary skill in the art, in view of the teachings of the prior art, to arrive at an apparatus having all of the claimed structural features and being capable of performing the recited function.” To the contrary, the Applicants respectfully submit that it is irrelevant that the claims of the ‘892 patent are not commensurate in scope with the instant claims; the relevant fact is that the claims that issued in the ‘892 patent (as well as the Declarations executed by Dr. Goodwin and Dr. O’Neill) **provide evidence that one of skill in the art would not have modified the apparatus of Kolluri with the features of the apparatus taught in Roth et al.**, or vice versa, due to the general understanding in the art at the time of the invention of the ‘892 patent that APGD plasmas, which are non-thermal equilibrium plasmas that operate at atmospheric pressure and which are the types of plasmas taught by Roth et al., required use of gas precursors and not liquid.

The issuance of the ‘892 patent was referenced as evidence of the fact that a person of skill in the art would not have known to atomize a liquid or liquid and solid-coating forming material into an APGD plasma, with the atomized liquid or liquid and solid-coating forming material then deposited on a substrate. The Declarations and the prosecution history of the ‘892 patent make clear that certain plasmas, such as those taught by Wang et al., may have involved atomization of liquid precursors therein, but that the liquid is always taught to be vaporized through the use of either vacuum pressure or high temperature plasmas. As such, prior to the invention of the ‘892 patent, neither Wang et al. or the prior art in general taught deposition of liquid or liquid and solid atomized material, in liquid or liquid and solid form, on substrates after exposure to plasma.

As previously set forth, Roth et al. is directed to a **steady-state, glow discharge plasma** in which a uniform plasma is produced without filamentary discharges (see Abstract and column 2, lines 46-52). The plasmas taught by Roth et al. also operate at atmospheric pressure. As made clear by the Declarations executed by Dr. Goodwin and Dr. O'Neill, those of skill in the art would not have known to use atomized liquid with plasmas such as those taught by Roth et al. at the time of the invention of the '892 patent. Because the apparatus taught by Roth et al. is designed for producing steady-state, glow discharge plasma in which a uniform plasma is produced without filamentary discharges at atmospheric pressure, and no other type of plasmas are taught by Roth et al., there is no basis for the Examiner to maintain a position that one of skill in the art would reasonably have been expected to modify the apparatus of Kolluri based on the teachings of Roth et al. with an expectation that the resulting apparatus could operate in accordance with its intended use. In particular, while the dielectric that is employed in the context of Roth et al. provides advantages to the apparatus for the purpose for which the apparatus of Roth et al. is intended, which is to produce a steady-state, glow discharge plasma at atmospheric pressure, there is no evidence whatsoever in the art that such dielectrics could be employed in the apparatus of Kolluri to similar effect, and there is also no evidence to show that the apparatus of Kolluri would even be expected to operate as intended with the presence of the dielectric as taught by Roth et al.

The fact that Roth et al. recognizes that covering an electrode on all sides discourages arcing from the edges or back side of the electrode plates in the context of the disclosed apparatus and plasma produced thereby does **nothing** to apprise one of skill in the

art that such a feature could be applied to an apparatus that does not even employ a dielectric plate (such as the apparatus of Kolluri), and that *clearly* is not intended to produce the same type of plasma as that of Roth et al. under conditions of atmospheric pressure. The effects of any such modifications on operation of the respective apparatuses cannot be ignored for risk of rendering the apparatus of Kolluri useless for its intended purposes.

The Examiner has opined that inclusion of the dielectric of Roth et al. would not destroy the principle of operation of the apparatus of Kolluri; however, the Examiner provides no basis for such an opinion and has not accounted for the fact that the apparatus of Kolluri is specifically designed for use under conditions of vacuum pressure. Unless the Examiner can show *some* evidence that operation of the apparatus of Kolluri would not be affected by the presence of the dielectric, the Applicants respectfully submit that the Examiner's arguments to this effect are overly conclusive and are not sufficient to maintain the Examiner's position of obviousness.

In view of the foregoing, the Applicants respectfully request the Examiner to reconsider the rejections of independent claim 1, as well as the claims that depend therefrom, under 35 USC §103(a) over the combined teachings of Kolluri and Roth et al.

**Rejections Relying Upon the Combination of Kolluri, Roth et al., and Rickerby et al. or O'Reilly et al.**

The Applicants respectfully submit that, in view of the foregoing traversal of the rejections over the combination of Kolluri and Roth et al., the rejections further relying upon Rickerby et al. or O'Reilly et al. are also overcome.

**Provisional Obviousness-Type Double Patenting Rejections**

The Applicants note that the obviousness-type double patenting rejection over co-pending U.S. App. No. 10/510555 is only a provisional rejection. Therefore, the Applicants expect that such provisional obviousness-type double patenting rejection will be held in abeyance until there is an indication of allowability of either the instant application or the '555 application.

In view of the foregoing, the Applicants respectfully submit that each of the instant rejections have been overcome such that independent claim 1, as well as the claims that depend therefrom, is in condition for allowance, which allowance is respectfully requested.

This Amendment is timely filed with the appropriate fee for a Request for Continued Examination (RCE), and it is believed that no further fees are presently due. However, the Commissioner is hereby authorized to charge any additional fees or credit any overpayment to our Deposit Account No. 08-2789.

Respectfully submitted,

**HOWARD & HOWARD ATTORNEYS PLLC**

Dated: January 15, 2009

/Christopher S. Andrzejak/  
**Christopher S. Andrzejak, Registration No. 57,212**  
450 West Fourth Street  
Royal Oak, Michigan 48067  
(248) 723-0438